REAL TIME PID CONTROL OF WIRELESS TWO-WHEELED BALANCING LEGO EV3 ROBOT

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ABSTRACT

Research on balancing two-wheeled robot has gained interest among researchers due to its highly nonlinear characteristic. The objective of this project is to control the stability of a two-wheeled EV3 Lego robot and maintain in the upright position while performing linear motion as well steering right/left and moving up/down a ramp. In this project, a two wheeled balancing Lego EV3 robot is modelled in a state space and controlled by PID controller. The robot can be controlled in real time via Matlab/Simulink interface using Graphical User Interface, GUI and the robot performance can be observed at the same time wirelessly using WIFI connection between robot and MATLAB. The analysis of the system plant has been made in terms of overshoot, settling time of tilt angle stabilization using simulation approach and successfully controlled using real two-wheeled EV3 hardware.

Keywords: Real-time PID controller, Two-wheel Lego Ev3 Robot and upright stability.